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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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ART UNIT	PAPER NUMBER
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/761,623	OKADA ET AL.
	Examiner	Art Unit	
	James A. Thompson	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>07 July 2005</u>.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-33</u> is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) <u>1-33</u> is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on <u>17 January 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☒ All   b)☐ Some * c)☐ None of:

　　　1.☒ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments filed 07 July 2005 have been fully
considered but they are not persuasive.   While Examiner does
agree with Applicant that the present amendments to the claims
overcome the prior art as applied to the claims in the previous
office action, dated 18 March 2005, additional art and new
grounds of rejection have been discovered which render the
claims obvious to one of ordinary skill in the art at the time
of the invention.   A detailed discussion with regard to the
rejections of the claims is given below.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which
forms the basis for all obviousness rejections set forth in this
Office action:

> (a) A patent may not be obtained though the invention is not
> identically disclosed or described as set forth in section 102 of this
> title, if the differences between the subject matter sought to be
> patented and the prior art are such that the subject matter as a whole
> would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the
> invention was made.

3.   Claims 1-5, 11-16, 22-28, 30 and 32 are rejected under 35
U.S.C. 103(a) as being unpatentable over Ikeda (US Patent
6,057,946) in view of Ercan (US Patent 6,240,217 B1) and Ball
(*Sams Teach Yourself Linux in 24 Hours*, by Bill Ball and Stephen
Smoogen, copyright 1998, Sams Publishing and Red Hat Press).

Regarding claims 1, 23 and 25:   Ikeda discloses an image
recording apparatus (figure 2 of Ikeda) comprising a first
converting unit (figure 2(208) of Ikeda) for converting image

data into primary data having an N-bit range (column 6, lines
57-63 of Ikeda) according to a first gradation conversion
characteristic (figure 3(quadrant I) and column 7, lines 19-22
of Ikeda); and a second converting unit (figure 2(25) of Ikeda)
for converting the image data into secondary data having an M-
bit range (column 9, lines 19-22 of Ikeda) according to a second
gradation conversion characteristic (column 9, lines 23-33 of
Ikeda). M is greater than N and thus has a larger number of
tone levels (column 9, lines 34-37 of Ikeda) representing the
same density range (figure 7; figure 15; and column 9, lines 40-
45 of Ikeda). Therefore, the second density range is lower in
the degree of level compression than the first gradation
conversion characteristic.

Ikeda further discloses a correlation calculating unit
(figure 2(214(portion)) of Ikeda) for calculating data that
determines correlation between the primary data and the
secondary data (figure 14("10 bit") and column 9, lines 18-22 of
Ikeda) and employing the calculated data as tertiary data
(column 7, lines 6-9 of Ikeda). The CPU (figure 2(214) of
Ikeda) sets the data in the LUT (column 7, lines 6-9 of Ikeda)
which is used to correlate the primary data and the secondary
data (column 9, lines 19-22 of Ikeda). The tertiary data
corresponds to the values stored in the 10-bit data column of
said LUT which correlate the 8-bit data to a corresponding 10-
bit data along a particular curve (column 9, lines 23-33 of
Ikeda). The correlation calculating unit corresponds to the
portion of the CPU (figure 2(214) of Ikeda), along with the
associated portions of RAM (figure 2(215) of Ikeda) used for
workspace and ROM (figure 2(216) of Ikeda) used for storing the
associated programs (column 5, lines 56-58 of Ikeda), that

calculates the correlation between said primary data and said
secondary data.

Ikeda further discloses a recording unit (figure 2(214
(portion)) of Ikeda) for recording the primary data in said LUT
(figure 14 and column 9, lines 18-22 of Ikeda). A portion of
the CPU (figure 2(214) of Ikeda) along with a corresponding
portion of RAM (figure 2(215) of Ikeda) and ROM (figure 2(214)
of Ikeda) controls the overall apparatus (column 5, lines 56-58
of Ikeda), which stores the 8-bit representation (figure 14 of
Ikeda) as part of the N-bit to M-bit conversion (column 9, lines
18-22 of Ikeda). Said recording unit records the primary data
and the tertiary data in said LUT (figure 14 and column 9, lines
18-22 of Ikeda). Said recording unit corresponds to the portion
of said CPU, along with corresponding portions of said RAM and
said ROM, that performs the actual writing of the primary data
and tertiary data to said LUT.

Ikeda does not disclose expressly that said correlation
between the primary data and the secondary data is according to
each position of each pixel, the calculated data including level
information in the secondary data which was lost in the primary
data; and that said primary data and said tertiary data are
written in a file.

Ercan discloses primary data having an N-bit (4-bit) range
(figure 9a and column 11, lines 11-13 and lines 18-23 of Ercan)
and secondary data having an M-bit (8-bit) range (figure 9b and
column 10, lines 25-29 of Ercan), wherein M (8) is greater than
N (4) (figure 7 and column 11, lines 24-26 of Ercan).
Calculated data that determines the correlation between the
primary data and the secondary data is according to each
position of each pixel (figure 9a(28); column 10, lines 43-52;

and column 11, lines 11-13 of Ercan), the calculated data
including level information in the secondary data which was lost
in the primary data (column 10, lines 25-29 and column 11, lines
32-34 of Ercan). The original 8-bit data is converted to 4-bit
data (column 10, lines 25-29 and column 11, lines 32-34 of
Ercan) in the region corresponding to the license plate (figure
9a(28) and column 11-13 of Ercan). The correlating data are the
bits that are not brought out using the bit-mask (column 11,
lines 32-34 of Ercan), and thus contain the information in the
secondary data that is lost in the primary data.

Ikeda and Ercan are combinable because they are from the
same field of endeavor, namely the manipulation of bit
resolution in digital image processing and analysis. At the
time of the invention, it would have been obvious to a person of
ordinary skill in the art to perform M-bit to N-bit conversion
based on the position of the pixels, as taught by Ercan. The
tertiary data taught by Ikeda would therefore include the
original data that is lost in the conversion to a lower number
of bits. The motivation for doing so would have been to be able
to selectively provide image data ranges so that a human viewer
can better resolve the image presented (column 3, lines 50-55 of
Ercan). Therefore, it would have been obvious to combine Ercan
with Ikeda.

Ikeda in view of Ercan does not disclose expressly that
said primary data and said tertiary data are written in a file.

Ball discloses storing digital data in a computer file
(page 78, lines 5-7 of Ball).

Ikeda in view of Ercan is combinable with Ball because they
are from similar problem solving areas, namely the storage and
manipulation of computer data. At the time of the invention, it

would have been obvious to a person of ordinary skill in the art
to store said primary and tertiary data, as taught by Ikeda in
view of Ercan, in a file, as taught by Ball. The motivation for
doing so would have been to be able to archive the data and thus
retrieve and/or transport said data later (page 78, lines 1-5 of
Ball). Therefore, it would have been obvious to combine Ball
with Ikeda in view of Ercan to obtain the invention as specified
in claims 1, 23 and 25.

Further regarding claim 23: The apparatus of claim 1
performs the steps of the image processing program of claim 23.

Further regarding claim 25: The apparatus of claim 1
performs the method of claim 25.

Regarding claim 12: The arguments regarding claims 1, 23
and 25 are incorporated herein.

Ikeda discloses that the primary data is 8-bit data (column
6, lines 57-63 of Ikeda). Said primary data can therefore
represent the density curve (figure 6 of Ikeda) at a maximum
number of 256 levels (column 7, lines 29-30 of Ikeda). 256
possible representations is therefore the limit of the amount of
information available about said density curve. Said primary
data is therefore irreversibly compressed since it is not
possible to obtain more information about the density curve from
8 bits of data. Any higher bit representations based on said 8-
bit data would necessarily be interpolations or other types of
approximations. Therefore, said recording unit is a unit for
irreversibly compressing the primary data and recording the
irreversibly compressed primary data.

Ikeda further discloses that said correlation calculating
unit is a unit for expanding the irreversibly compressed primary
data (column 9, lines 19-22 of Ikeda), calculating data that

determines correlation between the expanded primary data and the
secondary data (column 9, lines 9-13 and lines 28-33 of Ikeda),
and employing the calculated data as the tertiary data (column
9, lines 34-37 of Ikeda). The relationship used to determine
the correlation between the primary data and secondary data is
calculated (column 9, lines 28-33 of Ikeda) and used to convert
between said primary data (8-bit) and said secondary data (10-
bit) (column 9, lines 34-37 of Ikeda) and stored in the LUT
(figure 14 and column 9, lines 19-22 of Ikeda).

Regarding claims 2 and 13: Ikeda discloses that the
recording unit records the primary data in an image storage
segment (figure 14("8-bit") of Ikeda) to be preferentially
referred to, which is in the LUT (column 9, lines 18-22 of
Ikeda). Every element of the primary (8-bit) data is recorded
in a segment of the LUT (figure 14("8-bit") of Ikeda) and
referenced for the conversion between 8-bit image data and 10-
bit image data (column 9, lines 18-22 of Ikeda), thus causing
said 8-bit image data to be the data that is preferentially
referred to.

Ikeda in view of Ercan does not disclose expressly that the
primary data is in the file.

Ball discloses storing digital data in a computer file
(page 78, lines 5-7 of Ball).

Ikeda in view of Ercan is combinable with Ball because they
are from similar problem solving areas, namely the storage and
manipulation of computer data. At the time of the invention, it
would have been obvious to a person of ordinary skill in the art
to store said primary data in a computer file. The motivation
for doing so would have been to be able to archive the data and
thus retrieve and/or transport said data later (page 78, lines

1-5 of Ball). Therefore, it would have been obvious to combine
Ball with Ikeda in view of Ercan to obtain the invention as
specified in claims 2 and 13.

Regarding claims 3 and 14: Ikeda discloses that the
recording unit records the tertiary data (figure 14("10-bit") of
Ikeda) in an application segment optionally able to be added,
which is in the LUT (column 7, lines 22-24 and lines 29-30; and
column 9, lines 18-22 of Ikeda). The conversion data for the
laser output is stored in the LUT, which may be 8-bit conversion
data (column 7, lines 22-24 and lines 29-30 of Ikeda), or may
optionally be said tertiary (10-bit) data (column 9, lines 18-22
of Ikeda).

Ikeda in view of Ercan does not disclose expressly that the
tertiary data is in the file.

Ball discloses storing digital data in a computer file
(page 78, lines 5-7 of Ball).

Ikeda in view of Ercan is combinable with Ball because they
are from similar problem solving areas, namely the storage and
manipulation of computer data. At the time of the invention, it
would have been obvious to a person of ordinary skill in the art
to store said tertiary data in a computer file. The motivation
for doing so would have been to be able to archive the data and
thus retrieve and/or transport said data later (page 78, lines
1-5 of Ball). Therefore, it would have been obvious to combine
Ball with Ikeda in view of Ercan to obtain the invention as
specified in claims 3 and 14.

Regarding claims 4 and 15: Ikeda discloses that the first
gradation conversion characteristic and the second gradation
conversion characteristic have the same characteristic curve in
at least a part of an entire input signal range (figure 15 and

column 9, lines 34-37 of Ikeda). As can be clearly seen in
figure 15 of Ikeda, the first (8-bit) gradation conversion
characteristic and the second (10-bit) gradation conversion
characteristic have the same characteristic curve for the signal
range shown. They simply have a different number of levels that
can be displayed within said signal range (column 9, lines 34-37
of Ikeda).

Regarding claims 5 and 16: Ikeda discloses that the
correlation calculating unit calculates data relating to
dissimilarity between the primary data and the secondary data
(column 9, lines 22-33 of Ikeda) and employs the calculated data
as the tertiary data (column 7, lines 6-9 of Ikeda). Ikeda
teaches using an equation (column 9, lines 27-33 of Ikeda) to
calculate the conversion, and thus the dissimilarity, between
the 8-bit image data and the 10-bit image data (column 9, lines
22-26 of Ikeda), and then stores the relevant tertiary (10-bit)
data points in the LUT (figure 14("10-bit") of Ikeda) as
conversion data (column 7, lines 6-9 of Ikeda).

Regarding claims 11 and 22: Ikeda discloses that the
second converting unit changes the second gradation conversion
characteristic in accordance with a feature of the image data
(figure 20 and column 10, lines 27-35 of Ikeda). The tonality
conversion is modified based on whether the region of image data
is a highlight portion or an image portion (figure 20 and column
10, lines 27-35 of Ikeda).

Regarding claims 24 and 26: Ikeda discloses that the
primary data is 8-bit data (column 6, lines 57-63 of Ikeda).
Said primary data can therefore represent the density curve
(figure 6 of Ikeda) at a maximum number of 256 levels (column 7,
lines 29-30 of Ikeda). 256 possible representations is

therefore the limit of the amount of information available about said density curve. Said primary data is therefore irreversibly compressed since it is not possible to obtain more information about the density curve from 8 bits of data. Any higher bit representations based on said 8-bit data would necessarily be interpolations or other types of approximations. Therefore, said recording unit is a unit for irreversibly compressing the primary data and recording the irreversibly compressed primary data.

Ikeda further discloses that said correlation calculating unit is a unit for expanding the irreversibly compressed primary data (column 9, lines 19-22 of Ikeda), calculating data that determines correlation between the expanded primary data and the secondary data (column 9, lines 9-13 and lines 28-33 of Ikeda), and employing the calculated data as the tertiary data (column 9, lines 34-37 of Ikeda). The relationship used to determine the correlation between the primary data and secondary data is calculated (column 9, lines 28-33 of Ikeda) and used to convert between said primary data (8-bit) and said secondary data (10-bit) (column 9, lines 34-37 of Ikeda) and stored in the LUT (figure 14 and column 9, lines 19-22 of Ikeda).

Regarding claims 27, 30 and 32: Ikeda discloses an image recording apparatus (figure 2 of Ikeda) comprising a first converting unit (figure 2(208) of Ikeda) for converting image data into primary data having an N-bit range (column 6, lines 57-63 of Ikeda) according to a first gradation conversion characteristic (figure 3(quadrant I) and column 7, lines 19-22 of Ikeda); and a second converting unit (figure 2(25) of Ikeda) for converting the image data into secondary data having an M-bit range (column 9, lines 19-22 of Ikeda) according to a second

gradation conversion characteristic (column 9, lines 23-33 of
Ikeda). M is greater than N and thus has a larger number of
tone levels (column 9, lines 34-37 of Ikeda) representing the
same density range (figure 7; figure 15; and column 9, lines 40-
45 of Ikeda). Therefore, the second density range is lower in
the degree of level compression than the first gradation
conversion characteristic.

Ikeda further discloses a correlation calculating unit
(figure 2(214(portion)) of Ikeda) for calculating data that
determines correlation between the primary data and the
secondary data (figure 14("10 bit") and column 9, lines 18-22 of
Ikeda) and employing the calculated data as tertiary data
(column 7, lines 6-9 of Ikeda). The CPU (figure 2(214) of
Ikeda) sets the data in the LUT (column 7, lines 6-9 of Ikeda)
which is used to correlate the primary data and the secondary
data (column 9, lines 19-22 of Ikeda). The tertiary data
corresponds to the values stored in the 10-bit data column of
said LUT which correlate the 8-bit data to a corresponding 10-
bit data along a particular curve (column 9, lines 23-33 of
Ikeda). The correlation calculating unit corresponds to the
portion of the CPU (figure 2(214) of Ikeda), along with the
associated portions of RAM (figure 2(215) of Ikeda) used for
workspace and ROM (figure 2(216) of Ikeda) used for storing the
associated programs (column 5, lines 56-58 of Ikeda), that
calculates the correlation between said primary data and said
secondary data.

Ikeda further discloses a recording unit (figure 2(214
(portion)) of Ikeda) for recording the primary data in said LUT
(figure 14 and column 9, lines 18-22 of Ikeda). A portion of
the CPU (figure 2(214) of Ikeda) along with a corresponding

portion of RAM (figure 2(215) of Ikeda) and ROM (figure 2(214) of Ikeda) controls the overall apparatus (column 5, lines 56-58 of Ikeda), which stores the 8-bit representation (figure 14 of Ikeda) as part of the N-bit to M-bit conversion (column 9, lines 18-22 of Ikeda). Said recording unit (figure 2(214(portion)) of Ikeda) records the primary data and the tertiary data in said LUT (figure 14 and column 9, lines 18-22 of Ikeda). Said recording unit corresponds to the portion of said CPU, along with corresponding portions of said RAM and said ROM, that performs the actual writing of the primary data and tertiary data to said LUT.

Ikeda further discloses a reading unit (figure 2(214 (portion)) of Ikeda) for reading the primary data and the tertiary data from the LUT (column 9, lines 18-22 of Ikeda). In order for said image recording apparatus to convert the 8-bit data to 10-bit data using the primary data and the tertiary data stored in said LUT, said primary data and said tertiary data must be read. The reading unit corresponds to the portion of said CPU, along with corresponding portions of said RAM and said ROM, that performs the actual reading of the primary data and tertiary data from said LUT.

Ikeda further discloses a secondary data calculating unit (figure 2(214(portion)) of Ikeda) for reproducing the secondary data based on the primary data and the tertiary data (column 9, lines 34-38 of Ikeda). The secondary data calculating unit corresponds to the portion of said CPU, along with corresponding portions of said RAM and said ROM, that performs the transform using said primary data and said tertiary data stored in said LUT (column 9, lines 18-22 of Ikeda) to convert the primary (8-

bit) data to the secondary (10-bit) data (column 9, lines 34-38 of Ikeda).

Ikeda does not disclose expressly that said correlation between the primary data and the secondary data is according to each position of each pixel, the calculated data including level information in the secondary data which was lost in the primary data; that that said primary data and said tertiary data are written in a file; and that said reading unit reads the primary data and the tertiary data from a file.

Ercan discloses primary data having an N-bit (4-bit) range (figure 9a and column 11, lines 11-13 and lines 18-23 of Ercan) and secondary data having an M-bit (8-bit) range (figure 9b and column 10, lines 25-29 of Ercan), wherein M (8) is greater than N (4) (figure 7 and column 11, lines 24-26 of Ercan). Calculated data that determines the correlation between the primary data and the secondary data is according to each position of each pixel (figure 9a(28); column 10, lines 43-52; and column 11, lines 11-13 of Ercan), the calculated data including level information in the secondary data which was lost in the primary data (column 10, lines 25-29 and column 11, lines 32-34 of Ercan). The original 8-bit data is converted to 4-bit data (column 10, lines 25-29 and column 11, lines 32-34 of Ercan) in the region corresponding to the license plate (figure 9a(28) and column 11-13 of Ercan). The correlating data are the bits that are not brought out using the bit-mask (column 11, lines 32-34 of Ercan), and thus contain the information in the secondary data that is lost in the primary data.

Ikeda and Ercan are combinable because they are from the same field of endeavor, namely the manipulation of bit resolution in digital image processing and analysis. At the

time of the invention, it would have been obvious to a person of
ordinary skill in the art to perform M-bit to N-bit conversion
based on the position of the pixels, as taught by Ercan. The
tertiary data taught by Ikeda would therefore include the
original data that is lost in the conversion to a lower number
of bits. The motivation for doing so would have been to be able
to selectively provide image data ranges so that a human viewer
can better resolve the image presented (column 3, lines 50-55 of
Ercan). Therefore, it would have been obvious to combine Ercan
with Ikeda.

Ikeda in view of Ercan does not disclose expressly that
that said primary data and said tertiary data are written in a
file; and that said reading unit reads the primary data and the
tertiary data from a file.

Ball discloses storing digital data in a computer file
(page 78, lines 5-7 of Ball); and reading digital data from a
computer file (page 58, lines 18-24 of Ball).

Ikeda in view of Ercan is combinable with Ball because they
are from similar problem solving areas, namely the storage and
manipulation of computer data. At the time of the invention, it
would have been obvious to a person of ordinary skill in the art
to store said primary and tertiary data, as taught by Ikeda in
view of Ercan, in a file, as taught by Ball. Further, at the
time of the invention, it would have been obvious to a person of
ordinary skill in the art to read said primary and tertiary
data, as taught by Ikeda in view of Ercan, from a file, as
taught by Ball. The motivation for doing so would have been to
be able to archive the data and thus retrieve and/or transport
said data later (page 78, lines 1-5 of Ball). Therefore, it
would have been obvious to combine Ball with Ikeda in view of

Ercan to obtain the invention as specified in claims 27, 30 and 32.

Further regarding claim 30: The apparatus of claim 27 performs the steps of the image processing program of claim 30.

Further regarding claim 32: The apparatus of claim 27 performs the method of claim 32.

Regarding claim 28: Ikeda discloses that the secondary data calculating unit level-compresses the secondary data (figure 20 and column 10, lines 27-31 of Ikeda) so that the data has a bit range gradation-reproducible by an external apparatus, and outputs the level compressed data (figure 19 and column 10, lines 24-27 of Ikeda). For highlight regions, there is a high tonality representation (figure 20 and column 10, lines 27-31 of Ikeda). Therefore, the secondary (10-bit output) data is level-compressed for the highlight region (column 10, line 32 of Ikeda). Said level-compression is performed so that a laser output device can properly reproduce the image data (column 10, lines 24-27 and lines 33-35 of Ikeda).

4.   Claims 6-7, 10, 17-18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (US Patent 6,057,946) in view of Ercan (US Patent 6,240,217 B1), Ball (*Sams Teach Yourself Linux in 24 Hours*, by Bill Ball and Stephen Smoogen, copyright 1998, Sams Publishing and Red Hat Press), and Imai (US Patent 6,038,369).

Regarding claims 6 and 17: Ikeda in view of Ercan and Ball does not disclose expressly that the recording unit compresses the tertiary data by nonlinearly quantizing it and records the compressed tertiary data in the file.

Imai discloses compressing digital image data by nonlinear
quantization of said digital data (column 9, lines 61-62 of
Imai).

Ikeda in view of Ercan and Ball is combinable with Imai
because they are from similar problem solving areas, namely the
storage and manipulation of digital computer data. At the time
of the invention, it would have been obvious to a person of
ordinary skill in the art to use nonlinear quantization to
compress digital image data, as taught by Imai, said digital
image data being the tertiary data taught by Ikeda, and storing
said compressed digital image data in a file, as taught by Ball.
The motivation for doing so would have been to store only
perceptually critical information (column 9, lines 56-58 of
Imai). Therefore, it would have been obvious to combine Imai
with Ikeda in view of Ercan and Ball to obtain the invention as
specified in claims 6 and 17.

Regarding claims 7 and 18: Ikeda in view of Ercan and Ball
does not disclose expressly that the recording unit compresses
the tertiary data by increasing a sampling increment of the
tertiary data on an image space and records the compressed
tertiary data in the file.

Imai discloses compressing digital image data using Huffman
coding (column 9, lines 41-47 of Imai), which increases a
sampling increment of an image space since Huffman coding
minimizes redundancy by recording only perceptually critical
information (column 9, lines 41-42 and lines 56-58 of Imai).

Ikeda in view of Ercan and Ball is combinable with Imai
because they are from similar problem solving areas, namely the
storage and manipulation of digital computer data. At the time
of the invention, it would have been obvious to a person of

ordinary skill in the art to use compress digital image data by using Huffman coding, as taught by Imai, said digital image data being the tertiary data taught by Ikeda, and storing said compressed digital image data in a file, as taught by Ball. The motivation for doing so would have been to store only perceptually critical information (column 9, lines 56-58 of Imai). Therefore, it would have been obvious to combine Imai with Ikeda in view of Ercan and Ball to obtain the invention as specified in claims 7 and 18.

Regarding claims 10 and 21: Ikeda in view of Ercan and Ball does not disclose expressly that the recording unit compresses the tertiary data by run-length coding, entropy coding, and/or predictive coding, and records the compressed tertiary data in the file.

Imai discloses compressing digital image data using entropy coding (column 9, lines 41-44 of Imai).

Ikeda in view of Ercan and Ball is combinable with Imai because they are from similar problem solving areas, namely the storage and manipulation of digital computer data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use compress digital image data by using entropy coding, as taught by Imai, said digital image data being the tertiary data taught by Ikeda, and storing said compressed digital image data in a file, as taught by Ball. The motivation for doing so would have been to store only perceptually critical information (column 9, lines 56-58 of Imai). Therefore, it would have been obvious to combine Imai with Ikeda in view of Ercan and Ball to obtain the invention as specified in claims 10 and 21.

5.   Claims 8-9, 19-20, 29, 31 and 33 are rejected under 35
U.S.C. 103(a) as being unpatentable over Ikeda (US Patent
6,057,946) in view of Ercan (US Patent 6,240,217 B1), Ball (*Sams
Teach Yourself Linux in 24 Hours*, by Bill Ball and Stephen
Smoogen, copyright 1998, Sams Publishing and Red Hat Press), and
Hayashi (US Patent 5,754,683).

Regarding claims 8 and 19:   Ikeda in view of Ercan and Ball
does not disclose expressly that the recording unit
discriminates non-correlation regions that are image areas where
a substantial dissimilarity exists between the primary data and
the secondary data, and records the tertiary data in the file in
a manner that the tertiary data is divided into map data
indicating shapes of the non-correlation regions and data
indicating values of the non-correlation regions.

Hayashi discloses discrimination non-correlation regions
(figure 7(R1-R3) of Hayashi) that are image areas where a
substantial dissimilarity (figure 7(ΔX0…ΔX8) of Hayashi) exists
between primary image data (figure 7(Pj) of Hayashi) and
secondary image data (figure 7(PG) and column 14, lines 31-38 of
Hayashi), and records the tertiary (difference) data in a manner
that said tertiary data is divided into map data indicating
shapes of the non-correlation regions (figure 6b of Hayashi) and
data indicating value of the non-correlation regions (column 14,
lines 43-48 of Hayashi).   The gradation curve is divided into
three regions (figure 7(R1-R3) and column 14, lines 49-51 of
Hayashi) and the dissimilarity between a pre-stored gradation
curve (figure 7(PG) of Hayashi) and a measured gradation curve
(figure 7(Pj) of Hayashi) is measured at several points (column
14, lines 31-38 of Hayashi).   The closest shape out of a group
of stored shapes (figure 6b of Hayashi) is determined and used,

thus mapping and indicating the shapes of the non-correlation
regions (column 14, lines 43-48 of Hayashi).

Ikeda in view of Ercan and Ball is combinable with Hayashi
because they are from the same field of endeavor, namely digital
data processing. At the time of the invention, it would have
been obvious to a person of ordinary skill in the art to
determine a gradation curve shape that minimizes error and best
matches the measured shape of the gradation curve, as taught by
Hayashi, said curves being the primary (8-bit) gradation curve
and secondary (10-bit) gradation curve taught by Ikeda. The
motivation for doing so would have been to decrease processing
time by having a pre-determined set of possible gradation curve
shapes (column 2, lines 33-38 of Hayashi). Therefore, it would
have been obvious to combine Hayashi with Ikeda in view of Ercan
and Ball to obtain the invention as specified in claims 8 and
19.

Regarding claims 9 and 20: Ikeda in view of Ercan and Ball
does not disclose expressly that the recording unit
discriminates a non-coincidence position that is a position in
an image where the secondary data cannot be calculated directly
from the primary data, and records the tertiary data at the non-
coincidence position in the file.

Hayashi discloses discriminating a non-coincidence position
that is a position in a gradation curve (figure 7(G5) of
Hayashi), and therefore a corresponding pixel value which would
be represented at corresponding positions in an image, where the
secondary data (figure 7(PG) of Hayashi) cannot be calculated
directly from the primary data (figure 7(Pj) of Hayashi) (column
14, lines 31-38 of Hayashi). The data of the pre-stored
gradation curve (figure 7(PG) of Hayashi) cannot be calculated

directly from the measured gradation curve (figure 7(Pj) of
Hayashi), so the differences between them have to be directly
calculated (column 14, lines 31-38 of Hayashi). The tertiary
data ($\Delta X0...\Delta X8$) is recorded at the non-coincidence positions
since said tertiary data must be used for calculations at the
non-coincidence positions (column 14, lines 43-46 of Hayashi).

Ikeda in view of Ercan and Ball is combinable with Hayashi
because they are from the same field of endeavor, namely digital
data processing. At the time of the invention, it would have
been obvious to a person of ordinary skill in the art to
calculate and record the correction data of the gradation curve,
as taught by Hayashi, said correction data being the tertiary
data taught by Ikeda, into the file, as taught by Ball. The
motivation for doing so would have been to decrease processing
time by having a pre-determined set of possible gradation curve
shapes (column 2, lines 33-38 of Hayashi). Therefore, it would
have been obvious to combine Hayashi with Ikeda in view of Ercan
and Ball to obtain the invention as specified in claims 9 and
20.

Regarding claims 29, 31 and 33: Ikeda discloses an image
recording apparatus (figure 2 of Ikeda) comprising a first
converting unit (figure 2(208) of Ikeda) for converting image
data into primary data having an N-bit range (column 6, lines
57-63 of Ikeda) according to a first gradation conversion
characteristic (figure 3(quadrant I) and column 7, lines 19-22
of Ikeda); and a second converting unit (figure 2(25) of Ikeda)
for converting the image data into secondary data having an M-
bit range (column 9, lines 19-22 of Ikeda) according to a second
gradation conversion characteristic (column 9, lines 23-33 of
Ikeda). M is greater than N and thus has a larger number of

tone levels (column 9, lines 34-37 of Ikeda) representing the
same density range (figure 7; figure 15; and column 9, lines 40-
45 of Ikeda). Therefore, the second density range is lower in
the degree of level compression than the first gradation
conversion characteristic.

Ikeda further discloses a correlation calculating unit
(figure 2(214(portion)) of Ikeda) for calculating data that
determines correlation between the primary data and the
secondary data (figure 14("10 bit") and column 9, lines 18-22 of
Ikeda) and employing the calculated data as tertiary data
(column 7, lines 6-9 of Ikeda). The CPU (figure 2(214) of
Ikeda) sets the data in the LUT (column 7, lines 6-9 of Ikeda)
which is used to correlate the primary data and the secondary
data (column 9, lines 19-22 of Ikeda). The tertiary data
corresponds to the values stored in the 10-bit data column of
said LUT which correlate the 8-bit data to a corresponding 10-
bit data along a particular curve (column 9, lines 23-33 of
Ikeda). The correlation calculating unit corresponds to the
portion of the CPU (figure 2(214) of Ikeda), along with the
associated portions of RAM (figure 2(215) of Ikeda) used for
workspace and ROM (figure 2(216) of Ikeda) used for storing the
associated programs (column 5, lines 56-58 of Ikeda), that
calculates the correlation between said primary data and said
secondary data.

Ikeda further discloses a recording unit (figure 2(214
(portion)) of Ikeda) for recording the primary data in said LUT
(figure 14 and column 9, lines 18-22 of Ikeda). A portion of
the CPU (figure 2(214) of Ikeda) along with a corresponding
portion of RAM (figure 2(215) of Ikeda) and ROM (figure 2(214)
of Ikeda) controls the overall apparatus (column 5, lines 56-58

of Ikeda), which stores the 8-bit representation (figure 14 of
Ikeda) as part of the N-bit to M-bit conversion (column 9, lines
18-22 of Ikeda).

Ikeda further discloses a reading unit (figure 2(214
(portion)) of Ikeda) for reading the primary data and the
tertiary data from the LUT (column 9, lines 18-22 of Ikeda). In
order for said image recording apparatus to convert the 8-bit
data to 10-bit data using the primary data and the tertiary data
stored in said LUT, said primary data and said tertiary data
must be read. The reading unit corresponds to the portion of
said CPU, along with corresponding portions of said RAM and said
ROM, that performs the actual reading of the primary data and
tertiary data from said LUT.

Ikeda further discloses a secondary data calculating unit
(figure 2(214(portion)) of Ikeda) for reproducing the secondary
data based on the primary data and the tertiary data (column 9,
lines 34-38 of Ikeda). The secondary data calculating unit
corresponds to the portion of said CPU, along with corresponding
portions of said RAM and said ROM, that performs the transform
using said primary data and said tertiary data stored in said
LUT (column 9, lines 18-22 of Ikeda) to convert the primary (8-
bit) data to the secondary (10-bit) data (column 9, lines 34-38
of Ikeda).

Ikeda further discloses that said secondary data
calculating unit discriminates the non-coincidence positions
according to pixel values of the primary data (figure 15("point
not obtained in 8-bit output") and column 9, lines 38-43 of
Ikeda). The non-coincidence positions of Ikeda are the levels
of the 10-bit data which are not representable by the 8-bit data
(column 9, lines 38-43 of Ikeda). Said secondary data

calculating unit then disposes the tertiary data at the non-
coincidence positions and performs positioning between the
primary data and the tertiary data (column 9, lines 18-33 of
Ikeda). The 10-bit output image signal (column 9, lines 34-37
of Ikeda) is derived from the primary data (figure 14("8-bit")
of Ikeda) and secondary data (figure 14("10-bit") of Ikeda)
(column 9, lines 18-26 of Ikeda) using a specific equation
(column 9, lines 27-33 of Ikeda). Said secondary data
calculating unit then reproduces the secondary data based on the
primary data and the tertiary data that corresponds to the
primary data in pixel position (column 9, lines 34-37 and lines
52-55 of Ikeda).

Ikeda does not disclose expressly that said correlation
between the primary data and the secondary data is according to
each position of each pixel, the calculated data including level
information in the secondary data which was lost in the primary
data; that said primary data and said tertiary data is written
in a file; that said reading unit reads the primary data and the
tertiary data from a file; and that said recording unit
discriminates a non-coincidence position that is a position in
an image where the secondary data cannot be calculated directly
from the primary data, and records the tertiary data at the non-
coincidence position in the file.

Ercan discloses primary data having an N-bit (4-bit) range
(figure 9a and column 11, lines 11-13 and lines 18-23 of Ercan)
and secondary data having an M-bit (8-bit) range (figure 9b and
column 10, lines 25-29 of Ercan), wherein M (8) is greater than
N (4) (figure 7 and column 11, lines 24-26 of Ercan).
Calculated data that determines the correlation between the
primary data and the secondary data is according to each

position of each pixel (figure 9a(28); column 10, lines 43-52;
and column 11, lines 11-13 of Ercan), the calculated data
including level information in the secondary data which was lost
in the primary data (column 10, lines 25-29 and column 11, lines
32-34 of Ercan). The original 8-bit data is converted to 4-bit
data (column 10, lines 25-29 and column 11, lines 32-34 of
Ercan) in the region corresponding to the license plate (figure
9a(28) and column 11-13 of Ercan). The correlating data are the
bits that are not brought out using the bit-mask (column 11,
lines 32-34 of Ercan), and thus contain the information in the
secondary data that is lost in the primary data.

Ikeda and Ercan are combinable because they are from the
same field of endeavor, namely the manipulation of bit
resolution in digital image processing and analysis. At the
time of the invention, it would have been obvious to a person of
ordinary skill in the art to perform M-bit to N-bit conversion
based on the position of the pixels, as taught by Ercan. The
tertiary data taught by Ikeda would therefore include the
original data that is lost in the conversion to a lower number
of bits. The motivation for doing so would have been to be able
to selectively provide image data ranges so that a human viewer
can better resolve the image presented (column 3, lines 50-55 of
Ercan). Therefore, it would have been obvious to combine Ercan
with Ikeda.

Ikeda in view of Ercan does not disclose expressly that
said primary data and said tertiary data is written in a file;
that said reading unit reads the primary data and the tertiary
data from a file; and that said recording unit discriminates a
non-coincidence position that is a position in an image where
the secondary data cannot be calculated directly from the

primary data, and records the tertiary data at the non-coincidence position in the file.

Ball discloses storing digital data in a computer file (page 78, lines 5-7 of Ball) and reading digital data from a computer file (page 58, lines 18-24 of Ball).

Ikeda in view of Ercan is combinable with Ball because they are from similar problem solving areas, namely the storage and manipulation of computer data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a digital computer file, as taught by Ball, to store and read said primary and tertiary data, as taught by Ikeda in view of Ercan. The motivation for doing so would have been to be able to archive the data and thus retrieve and/or transport said data later (page 78, lines 1-5 of Ball). Therefore, it would have been obvious to combine Ball with Ikeda in view of Ercan.

Ikeda in view of Ercan and Ball does not disclose expressly that said recording unit discriminates a non-coincidence position that is a position in an image where the secondary data cannot be calculated directly from the primary data, and records the tertiary data at the non-coincidence position in the file.

Hayashi discloses discriminating a non-coincidence position that is a position in a gradation curve (figure 7(G5) of Hayashi), and therefore a corresponding pixel value which would be represented at corresponding positions in an image, where the secondary data (figure 7(PG) of Hayashi) cannot be calculated directly from the primary data (figure 7(Pj) of Hayashi) (column 14, lines 31-38 of Hayashi). The data of the pre-stored gradation curve (figure 7(PG) of Hayashi) cannot be calculated directly from the measured gradation curve (figure 7(Pj) of Hayashi), so the differences between them have to be directly

calculated (column 14, lines 31-38 of Hayashi). The tertiary data ($\Delta X0...\Delta X8$) is recorded at the non-coincidence positions since said tertiary data must be used for calculations at the non-coincidence positions (column 14, lines 43-46 of Hayashi).

Ikeda in view of Ercan and Ball is combinable with Hayashi because they are from the same field of endeavor, namely digital data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to calculate and record the correction data of the gradation curve, as taught by Hayashi, said correction data being the tertiary data taught by Ikeda in view of Ercan, into the file, as taught by Ball. The motivation for doing so would have been to decrease processing time by having a pre-determined set of possible gradation curve shapes (column 2, lines 33-38 of Hayashi). Therefore, it would have been obvious to combine Hayashi with Ikeda in view of Ercan and Ball to obtain the invention as specified in claims 29, 31 and 33.

Further regarding claim 31: The apparatus of claim 29 performs the steps of the image processing program of claim 31.

Further regarding claim 33: The apparatus of claim 29 performs the method of claim 33.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the

organization where this application or proceeding is assigned is
571-273-8300.

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                                    James A. Thompson
                                    Examiner
                                    Art Unit 2624

09 September 2005

THOMAS D.
TOMMY LEE
PRIMARY EXAMINER